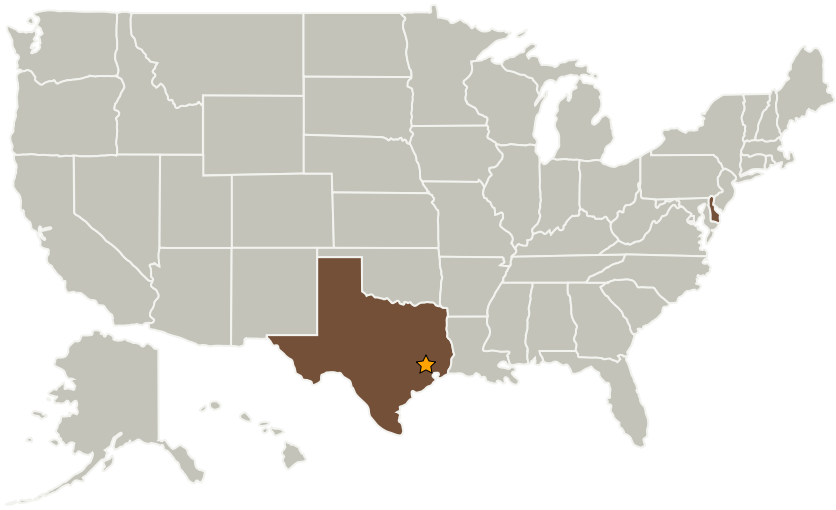
Novel Long-Term CO2 Removal System, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

Current Technology for CO2 removal from enclosed air of spacecraft utilizes LiOH canisters for CO2 absorption. This absorption is irreversible so longer flights require more LiOH. For long duration flights it is essential that a small, lightweight system that recovers the CO2 be developed. This allows the CO2 to be used to regenerate O2 for re-use. Compact Membrane systems (CMS) has identified a novel membrane contactor process for absorption and subsequent desorption of the CO2. Key to the process is that the contactor both operate effectively and that loss of the absorption/desorption fluid be kept to a minimum. In Phase I, CMS will build system and demonstrate systems capability with a focus on key desorption unit operation. Analysis will demonstrate ability to transport CO2 while maintaining minimal loss of absorbent. System stability will be demonstrated by evaluating performance over wide temperature range (30-90o C). Chemical stability with absorbants will also be demonstrated. With all the above basic data in hand, we will evaluate the needed system size, weight and power consumption. Lastly we will compare results to molecular sieve adsorbants which are the incumbent for long duration flights.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Compact Membrane Systems, Inc.	Supporting Organization	Industry	Newport, Delaware

Primary U.S. Work Locations	
Delaware	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Kenneth Pennisi

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.3 Resource Processing for Production of Mission Consumables